

WHAT IS CLAIMED IS:

1. A method of providing minimal power consuming redundant computing elements for a distributed application comprised of a plurality of components, wherein the plurality of components are hosted by a plurality of computing elements that can each enter a power saving mode, the method comprising:
  - detecting an impending or actual failure of an affected computing element;
  - identifying instances of components executing on the affected computing element;
  - signaling a cold spare computing element to enter a normal operation mode from the power saving mode; and
  - initializing instances of identified components on the cold spare computing element now operating in normal operation mode.
2. The method of claim 2 and further comprising:
  - gracefully suspending all instances of identified components, if possible, executing on the affected computing element; and
  - signaling the affected computing element to enter a hot swap mode from the normal operation mode.
3. The method of claim 3 and further comprising:
  - replacing the affected computing element with a replacement computing element;
  - signaling the replacement computing element to enter the normal operation mode from the hot swap mode;
  - initializing instances of identified components on the replacement computing element now operating in the normal operation mode;
  - gracefully suspending all instances of identified components on the cold spare computing element; and
  - signaling the cold spare computing element to enter the power saving mode from the normal operation mode.

- 1        4.    A computer program product comprising:  
2            at least one computer usable medium having computer readable code embodied  
3            therein for providing availability of minimal power consuming redundant  
4            computing elements for a distributed application comprised of a plurality of  
5            components, wherein the plurality of components are hosted by a plurality of  
6            computing elements that can each enter a power saving mode, the computer  
7            program product including:  
8            first computer readable program code devices configured to detect an impending  
9            or actual failure of an affected computing element;  
10           second computer readable program code devices configured to identify instances  
11           of components executing on the affected computing element;  
12           third computer readable program code devices configured to signal a cold spare  
13           computing element to enter a normal operation mode from the power  
14           saving mode; and  
15           fourth computer readable program code devices configured to initialize instances  
16           of identified components on the cold spare computing element now  
17           operating in the normal operation mode.
- 1        5.    The computer program product of claim 4 further including:  
2            fifth computer readable program code devices configured to gracefully suspend all  
3            instances of identified components, if possible, executing on the affected  
4            computing element; and  
5            sixth computer readable program code devices configured to signal the affected  
6            computing element to enter a hot swap mode from the normal operation mode.
- 1        6.    The computer program product of claim 5 further including:  
2            seventh computer readable program code devices configured to detect a replacement  
3            of the affected computing element with a replacement computing element;

4 eighth computer readable program code devices configured to signal the replacement  
5 computing element to enter the normal operation mode from the hot swap mode;  
6 ninth computer readable program code devices configured to initialize instances of  
7 identified components on the replacement computing element now operating in  
8 the normal operation mode;  
9 tenth computer readable program code devices configured to gracefully suspend all  
10 instances of identified components on the cold spare computing element; and  
11 eleventh computer readable program code devices configured to signal the cold spare  
12 computing element to enter the power saving mode from the normal operation  
13 mode.

- 14 7. A computer system comprising:  
15 a backplane;  
16 a plurality of host processor cards coupled to the backplane, with the plurality of host  
processor cards hosting a distributed application comprised of a plurality of  
components, and at least one of the plurality of cards designated as a cold spare  
host processor card that is normally kept in a power saving mode; and  
a management unit coupled to the back plane, the management unit operable to signal  
each of the plurality of host processor cards to enter the power saving mode and  
a normal operation mode, and executing a program that:  
detects an impending or actual failure of an affected host processor card of the  
plurality of host processor cards;  
identifies instances of components executing on the affected host processor card;  
signals the cold spare host processor card to enter the normal operation mode  
from the power saving mode; and  
initializes instances of identified components on the cold spare host processor  
card now operating in normal operation mode.

1 8. The computer system of claim 7 wherein the program executing on the management  
2 unit also:  
3 gracefully suspends all instances of identified components, if possible, executing on  
4 the affected host processor card; and  
5 signals the affected host processor card to enter a hot swap mode from the normal  
6 operation mode.

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7 9. The computer system of claim 8 wherein the program executing on the management  
8 unit also:  
9 detects replacement of the affected host processor card with a replacement host  
10 processor card;  
11 signals the replacement host processor card to enter the normal operation mode from  
12 the hot swap mode;  
initializes instances of identified components on the replacement host processor card  
now operating in the normal operation mode;  
gracefully suspending all instances of identified components on the cold spare  
computing element; and  
signaling the cold spare computing element to enter the power saving mode from the  
normal operation mode.